a receiver receiving the millimeter band signal through said receive antenna,

wherein, in a normal state when said line of sight propagation path is unobstructed, said receiver receives the millimeter band signal through each of the plurality of propagation paths including said line of sight propagation path, and

wherein, in an obstructed state when said line of sight propagation path is obstructed, said receiver receives the millimeter band signal through each of the plurality of propagation paths except said line of sight propagation path.

REMARKS

Status of Claims

Claims 1-40 are pending in the above-identified application. Claims 1, 11, 15, and 18 are independent.

Claim Rejections

Summary of Differences

At the outset, none of the references relied on in the prior art rejections are directed to a millimeter band signal transmitting/receiving system. Of all of the references relied on, Freeburg comes closest to the present invention by disclosing a system for high data bit rate communication within a building.

However, it teaches transmission of high bit rate data on a radio frequency communication channel (Freeburg at column 2, lines 62-65). Also, Freeburg is directed to handling a problem of multipath interference that results when a signal that is transmitted by one terminal is received at the other terminal at two different times along separate paths (Freeburg at column 3, lines 12-14). Freeburg solves the multipath problem by using multiple directional antennas (or alternatively using a steerable antenna; Freeburg at column 3, lines 36-42). Furthermore, none of the references relied on deal with the particular problems associated with millimeter band signal transmission.

It is known that mobile radio-telephone communication systems that communicate over a radio frequency channel, without changing the transmitting/receiving components, cannot transmit and receive data as millimeter band signals. Special equipment is required (see, for example, H. Tsui, et al., "Array Antenna Design for Tracking Mobiles in Millimeter-Wave Wireless Access Systems"). The term millimeter wave frequency bands refers to the fact that wavelength radio signals on frequencies between 30 GHz and 300 GHz ranges from one to ten millimeter waves (see FCC document: "New Rules Proposed to Increase the Amount of Spectrum Available for Commercial Use"). The millimeter wave frequency spectrum is a wide bandwidth that has the benefit of compact antenna and radio components. Thus, the millimeter wave band spectrum has proven popular for implementing high bandwidth data

communications systems, such as wireless broadband networking within a building or home.

A problem with millimeter band wave signals, however, has been that millimeter wave signals are easily obstructed (Specification, page 1). Thus, it has generally been considered that transmission of millimeter band wave signals would be unsuitable for mobile wireless communications. Another problem has been the requirement to replace base stations with more expensive base stations that can receive millimeter wave signals. Known approaches to solving the problem of signal path obstruction have been used in broadband networking within a building or home and include, changing the direction of the terminal station antenna, or through use of a plurality of base stations. Such approaches rely on the principle that one radiowave path is selectively used at a time.

The present invention is directed to a millimeter band signal transmitting/receiving system that is designed to simultaneously receive redundant millimeter band signals. The redundancy is accomplished by transmitting one signal over an indirect propagation path. Thus, the present invention solves the obstruction problem that occurs with millimeter band signals, but does not require selective use of one radiowave path.

Rejection under 35 U.S.C. 102(e)

Claims 1-3, 7, 8, 11, 14, 33 and 35 have been rejected under 35 U.S.C. §102(e) as being anticipated by Brunner et al. (U.S. Patent 6,301,470, hereinafter Brunner). Applicants respectfully traverse that rejection.

Brunner

Brunner is directed to radio communication receivers which operate to detect radio signals contemporaneously transmitted by first and second transmitters and to recover first and second data (Field of the Invention). The radio communication receivers can be used for wide band code division multiple access (W-CDMA) signals, time division multiple access signals, or time division multiple access signals (column 6, lines 58-63). Radio signal wavefronts associated with radio signals are contemporaneously transmitted by one of two mobile stations MS1 and MS2 and are received by an antenna array 4 (with respect to Figure 1, see column 5, lines 12-20). In addition, as a result of multi-path propagation, a number of wave fronts which have been generated by the same transmitter may arrive at the antenna array. In the later case, a wave front detector 11 estimates the channel input response associated with each of the wave fronts and determines a relative strength of each of the wave fronts (column 5, lines 21-32). In accordance with the determined strength of the wave fronts, a spatio-temporal filter is able to determine whether data may be recovered from a particular set of wave fronts associated with the same transmitted radio signals.

Differences from Brunner

The present invention is directed to a millimeter band signal transmitting and receiving system. Brunner, on the other hand, is directed to a radio communication receiver for a mobile phone system that utilizes the radio spectrum allocated to a wireless communication system (Brunner at column 1, lines 39-41). Brunner's radio communication receiver corrects a problem with radio receivers that handle time division multiple access signals, wherein reconstructed wave fronts from one transmitter may be corrupted by a stronger interfering radio signal wave front generated by another transmitter, to the effect that the data cannot be recovered (Brunner at column 2, lines 10-20).

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. Dismissed, 468 U.S. 1228 (1984); W.L. Gore and Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. Denied, 469 U.S. 851 (1984).

Independent claim 1 is directed to a millimeter band signal transmitting/receiving system. The transmitting/receiving system is arranged such that a plurality of millimeter band signal waves over a plurality of propagation paths are simultaneously received at a receiver. That arrangement

helps to ensure that at least one millimeter band signal wave is received, and when more than one signal wave is received, there is a minimum adverse affect (see specification, p. 8, ll. 19-28). Thus, the millimeter band transmitting/receiving system is ideally suited for transmitting video signals in a house.

Brunner does not at least teach or suggest a system for transmitting/receiving millimeter band signals. Further, Applicants submit that Brunner fails to teach or suggest at least, "a receiver simultaneously receiving a plurality of said millimeter signal waves from a plurality of propagation paths including a line of sight propagation path to said transmitter and said at least one indirect propagation path."

The Office Action alleges that the disclosure with respect to Figure 2 of Brunner constitutes the claimed invention (in particular, with respect to the discussion of multi-path propagation, on column 5, lines 20-25). Specifically, Brunner states that, "as a result of multi-path propagation, which is characteristic of radio communications, a number of wave fronts which have been generated by the same transmitter may arrive at the antenna array 4." Applicants submit that the multi-path propagation problem addressed by Brunner requires use of a spatial-temporal filter 8 because the wave fronts arrive at different times at different powers over the different paths (see Freeman at column 3, lines 12-49, which addresses the same problem). Thus, Applicants

submit that Brunner fails to disclose a receiver receiving millimeter band signal waves, and much less simultaneous reception of a plurality of millimeter band signal waves. Accordingly, at least for this reason, Applicants submit that Brunner does not anticipate claim 1.

Claim 11 is also directed to a millimeter band signal transmitting/receiving system that includes, among other things, a receiver arranged to simultaneously receive a plurality of millimeter band signal waves. Thus, at least for the same reason as above for claim 1, Applicants submit that Brunner does not anticipate claim 11, as well.

With respect to the dependent claims 2, 3, 7, 8, 14, 33 and 35, for the same reasons as above for independent claims 1 and 11, Applicants submit that Brunner does not anticipate those claims, as well. In addition, further with respect to claim 2, Applicants disagree that Brunner teaches a reflector that is arranged to reflect a millimeter signal wave and direct the reflected signal to the receiver. The Office Action alleges that Figure 2 teaches that claimed limitation. However, Applicants submit that Figure 2 of Brunner only shows an arbitrarily reflected radio frequency signal and not a reflector that has been arranged to direct a signal. As has been mentioned before, the communications system in Brunner involves mobile stations. Such a system having a benefit of mobility does not lend itself to an arrangement of reflectors relative to the transmitter and receiver. Thus, Applicants submit that Brunner does not teach or suggest a

reflector arranged to reflect a signal wave transmitted from said transmitter and direct the signal wave to the receiver. Accordingly, Applicants submit that at least for this additional reason Brunner does not anticipate claim 2.

Further with respect to claim 8, Applicants disagree that Brunner discloses wherein the receiver always simultaneously receives the plurality of signal waves from a plurality of propagation paths in a normal state. The Office Action alleges that Figure 2 of Brunner teaches this limitation. However, the specification of Brunner clearly expresses where wave fronts which have been generated by the same transmitter may arrive at the antenna array 4 (column 5, lines 21-25). Brunner does not disclose, for example, wave fronts which always simultaneously arrive at the antenna array.

Furthermore, Brunner, being directed to a communications system having mobile stations teaches away from such a limitation. Brunner provides a solution to the multi-path problem, not a requirement that the signals be sent via multi-path and simultaneously. Thus, Applicants submit that Brunner fails to teach or suggest the claimed receiver always simultaneously receiving the plurality of signal waves. Similarly, the same argument can be made for claim 14 as was made for claim 8. Accordingly, at least for this additional reason, Applicants submit that Brunner does not anticipate claims 8 and 14.

Rejection under 35 U.S.C. 103(a) over Freeburg and Brunner

Claims 15-17 and 36 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Freeburg (U.S. Patent 5,095,535) in view of Brunner. Applicants respectfully traverse this rejection.

The Office Action alleges that Freeburg discloses the claimed house with a millimeter band signal transmitting/receiving system (relying on column 3, lines 15-55, and column 5, lines 9-20), except for a receiver simultaneously receiving a plurality of signal waves through a plurality of propagation paths. The Office Action instead relies on Brunner for teaching that deficiency in Freeburg. Applicants disagree.

Freeburg is directed to high data rate transmission on a radio frequency communication channel in a cellular radiotelephone communication system employed within a building (Freeburg at column 2, lines 62-68). Freeburg does not disclose millimeter band signals, and does not disclose a transmitter and an associated receiver for the millimeter band signals. Thus, Freeburg does not teach or suggest all of the claimed elements except for a receiver simultaneously receiving a plurality of signal waves through a plurality of propagation paths, as alleged in the Office Action.

Further, Freeburg defines and addresses the problem of multipath interference. Multipath interference is defined as when a signal that is transmitted at one terminal is received at the other terminal at two different

times (Freeburg at column 3, lines 12-14). The multipath interference problem is partly addressed through the use of multiple directional antennas, or alternatively through a steerable antenna (Freeburg at column 3, lines 36-42).

Brunner also addresses the multipath interference problem. Brunner states that, "as a result of multi-path propagation, which is characteristic of radio communications, a number of wave fronts which have been generated by the same transmitter may arrive at the antenna array 4." Applicants submit that the multi-path propagation problem addressed in Brunner requires use of a spatio-temporal filter 8 because the wave fronts arrive at different times at different powers over the different paths (see Freeman at column 3, lines 12-49, which addresses the same problem). Similar to the above for claims 1 and 11, Applicants submit that Brunner also fails to disclose a receiver receiving millimeter band signal waves, and much less simultaneous reception of a plurality of millimeter band signal waves. Thus, Applicants submit that Brunner fails to make up for the deficiency in Freeburg, and that Freeburg and Brunner, either alone or in combination, do not teach or suggest all claimed elements of claim 15.

With respect to the dependent claims 16, 17 and 36, Applicants submit that at least for the same reason as above for claim 15, Freeburg and Brunner, either alone or in combination, fail to teach or suggest all claimed elements of those claims as well. In addition, with respect to claim 17, Applicants submit

that Freeburg does not teach the claimed reflector arranged inside a structural component defining an internal space, as alleged in the Office Action. Claim 17 is directed to, for example, a picture having on its back surface an aluminum foil used as a reflector (Specification at page 9, lines 25-31). Freeburg does disclose "many reflecting surfaces" located in an indoor/office application (Freeburg at column 4, lines 9-18). Further, Freeburg discloses an apparatus for dealing multipath interference due to the reflecting surfaces. However, Freeburg does not disclose arranging reflectors, and much less arranging reflectors inside a structural component. Thus, Applicants submit that at least for this additional reason, Freeburg and Brunner, either alone or in combination, fail to teach all claimed elements of claim 17.

Rejection under 35 U.S.C. 103(a) over Brunner and Lewiner

Claims 18-26, 31, 32 and 34 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner in view of Lewiner (U.S. Patent 5,926,768). Applicants respectfully traverse this rejection.

The Office Action relies on Brunner for teaching the claimed invention of claim 18, except for the limitations associated with a normal state and an obstructed state of the transmitting/receiving system. The Office Action instead relies on Lewiner for making up for the deficiency in Brunner. In particular, the Office Action alleges that Lewiner discloses the limitation wherein, in an

obstructed state when the line of sight propagation path is obstructed, the receiver receives the signal through each of the propagation paths except the line of sight propagation path (relying in column 5, lines 13-16). Applicants disagree that the combination of Brunner and Lewiner teach all claimed elements.

As in the above for claim 1, Applicants submit that Brunner fails to teach or suggest the elements of claim 18, at least including a transmitter transmitting a millimeter band signal along a plurality of propagation paths, and a receiver receiving the millimeter signal waves. Instead, Brunner is directed to a radio communication receiver for a mobile phone system that utilizes the radio spectrum allocated to a wireless communication system (Brunner at column 1, lines 39-41). Being based on the radio spectrum, the system disclosed by Brunner is not applicable to transmitting and receiving millimeter band signals and does not address problems associated with transmitting such signals. Thus, Applicants disagree that Brunner even teaches the alleged claimed elements of claim 18.

In addition, Applicants submit that Lewiner does not make up for the deficiencies in Brunner. Specifically, Lewiner does not disclose a millimeter band signal transmitting/receiving system, and does not disclose a normal state and an alternative obstructed state for the system. Claim 18 defines the normal state of the transmitting/receiving system as "when said line of sight propagation path is unobstructed," and defines the obstructed state as "when said line of sight

propagation path is obstructed." Further, the claim recites that in the obstructed state, "said receiver receives the signal through each of the plurality of propagation paths except said line of sight propagation path." In other words, in the obstructed state the receiver does not receive the signal through the line of sight propagation path.

Relying on the recited definition of "obstructed," Applicants disagree that Lewiner teaches the claimed obstructed state. Applicants agree that Lewiner's system takes into account multiple reflections of radio waves on various obstacles M between a mobile unit and a receiving antenna (Lewiner, Figure 1; at column 5, lines 14-16). However, the obstacles do not at least "obstruct" a line of sight propagation path. Rather, the obstacles reflect the radio waves and the reflected radio waves are received by the antenna. Thus, Applicants submit that Lewiner does not at least make up for the deficiency of Brunner of not teaching or suggesting a normal state and an alternative obstructed state of operation of the transmitting/receiving system. Accordingly, for the above reasons, Applicants submit that the rejection fails to establish *prima facie* obviousness for claim 18.

With respect to the dependent claims 19-26, 31, 32 and 34, Applicants submit that Brunner and Lewiner, either alone or in combination, fail to teach or suggest all claimed elements for those claims as well. In addition, with respect to claims 25 and 26, the Office Action takes Official Notice of the elements recited

in those claims. **Applicants disagree that the elements recited in claim 25 and 26 are notoriously well known in the art, and request that the Examiner provide evidence of the claimed elements in the context of a millimeter band signal transmitting/receiving system including two millimeter band signal transmitters.**

Remaining Claim Rejections

Dependent claims 4-6 and 9 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner, as applied to claim 1, in view of Freeburg. Claim 10 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Freeburg, as applied to claim 9, and further in view of Wax et al. (U.S. Patent 6,249,680, hereinafter Wax). Claims 37 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Freeburg and Brunner, as applied to claim 15, in view of Lewiner. Claim 30 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Lewiner, as applied to claim 18, in view of Freeburg. Claims 12 and 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner, as applied to claim 11, in view of Kagami (U.S. Patent 5,479,443). Claim 27 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and Lewiner, as applied to claim 18, in view of Evans et al. (U.S. Patent 5,920,813, hereinafter Evans). Claims 28 and 29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner and

Lewiner, as applied to claim 18, in view of Keskitalo et al. (U.S. Patent 6,128,486, hereinafter Keskitalo). Claims 38 and 39 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner, as applied to claim 1, in view of Keskitalo. Claim 40 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Freeburg and Brunner, as applied to claim 15, in view of Keskitalo.

As for the rejections of the dependent claims, some of which are based on additional references of Wax, Evans, Kagami and Keskitalo, for at least the same reasons as above for the respective independent claims, Applicants submit that all claimed elements are not taught or suggested for these claims as well. Similar to Brunner, none of Wax, Evans, Kagami and Keskitalo are directed to millimeter wave transmitting/receiving system, nor do they address the problem of obstruction that occurs with millimeter band wave transmission. Thus, for this reason none of these additional references, either alone or in combination, at least make for the deficiency of Brunner. Accordingly, Applicants submit that the rejections fail to establish *prima facie* obviousness for the dependent claims as well.

In addition, with respect to the rejection of claims 4-6 and 9, Applicants disagree that Brunner and Freeburg, either alone or in combination, teach or suggest the additional elements recited in those claims.

Claims 4-6 are directed to further limitations for the reflector, recited in claim 2. The reflector is arranged to redirect a signal wave to the receiver. Alternative materials have been found to provide suitable reflection of the wave to give an adequate intensity, and at the same time not impair the appearance of the house (specification, p. 10, l. 21, to p. 11, l. 17). The Office Action relies on Freeburg for teaching the missing reflector materials not disclosed in Brunner. Using claim 4 as an exemplary claim, the Office Action states as a reason to rely on the teachings of Freeburg, "it would have been obvious to one of ordinary skill in the art to use a certain kind of material such as aluminum or metal to reflect signals." Applicants submit that one of ordinary skill in the art would not be motivated to apply materials such as aluminum for use as reflectors in the wireless communication system of Brunner.

Brunner is directed to a wireless communications system subject to multi-path propagation. The objects that typically cause the multi-path signals are objects in the environment, such as buildings, hills, or other structures. They are not objects that would be arranged as part of the design of the system. Thus, Applicants submit that the teachings in Freeburg are not of the nature that would be in any way combinable with the system of Brunner. For example, Applicants submit that one of ordinary skill in the art would not be motivated to construct buildings to have aluminum for purposes of serving as reflectors for guiding waves to a base station. Furthermore, the motivation statements made

in the Office Action are conclusionary in nature and do not provide a motivation, suggestion, or teaching of the desirability of combining the teachings of Freeburg with Brunner. Thus, Applicants submit that the Office Action has failed to present a *prima facie* case of obviousness for claims 4-6.

In addition, with respect to claim 9, the Office Action relies on Freeburg for teaching the claimed transmitter spaced by a prescribed distance from the structural component for transmitting the signal wave at a prescribed transmission angle. Applicants submit, however, that Freeburg does not specifically teach or suggest a prescribed distance and prescribed transmission angle, and actually teaches away from such an arrangement between the structural component and transmitter. Freeburg instead discloses where the directional antennas have little or no relationship with the actual physical coverage, and are primarily used to control multipath (Freeburg at column 4, lines 14-18). Thus, for this additional reason, Applicants submit that Freeburg and Brunner, either alone or in combination, fail to teach all claimed elements. Further, even if a *prima facie* case of obviousness has been made, Freeburg teaches away from the claimed invention. Accordingly, for these reasons, Applicants respectfully request that the rejection of claims 4-6 and 9 be withdrawn.

In addition, with respect to the rejection of claims 12 and 13, Applicants disagree that Brunner and Kagami, either alone or in combination, teach or suggest the additional elements recited in those claims.

Claims 12 and 13 are further directed to the transmitter/receiving system having a plurality of transmitters, each including a local oscillator oscillating at a prescribed frequency for generating a signal wave at the same frequency and/or in synchronization with each other. In the present invention, local oscillator frequencies for the transmitters are the same so that frequencies of the corresponding transmitted waves are made the same, in order to prevent interruption. The Office Action relies on Kagami for teaching the claimed limitations of a local oscillator in each of a plurality of transmitters for generating a signal wave at the same frequency, or, for teaching a common local oscillator between transmitters.

Kagami, however, is directed to a radio relay system and no teaching or suggestion is provided for combining the teachings of Kagami with the location finding method of Brunner. The Office Action states as a motivation for claim 12 that, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a common frequency for the transmitters to generate simultaneous signals." Applicants submit, however, that the motivation statement does not provide a rational for combining the teachings of Kagami with Brunner. Neither the Office Action, nor either the Brunner or Kagami

references, provide a motivation to incorporate a local oscillator generating the same frequency for each of a plurality of transmitters, or to incorporate a common oscillator for a plurality of transmitters, where the transmitters are, for example, the mobile stations in Brunner. In other words, Kagami does not teach or suggest, for example, a rational for having mobile stations, such as in Brunner, transmit at the same frequency so that a receiver, such as Brunner's radio communications receiver, can receive their signals simultaneously. Thus, Applicants submit that a *prima facie* case of obviousness has not been made for combining Brunner and Kagami. Thus, claims 12 and 13 are not unpatentable over Kagami and Brunner, either alone or in combination. Accordingly, Applicants request that the rejection of claims 12 and 13 under 35 U.S.C. 103 be withdrawn.

Conclusion

In view of the above amendments and remarks, reconsideration of the rejections and allowance of each of claims 1-40 in connection with the present application are earnestly solicited.

Pursuant to the provisions of 37 C.F.R. § 1.17 and § 1.136(a), Applicant hereby petitions for an extension of one (1) month in which to file a response to the outstanding Office Action. The required fee of $110.00 is attached hereto.

If there are any outstanding matters remaining in this application, the Examiner is invited to contact Robert W. Downs (Registration Number 48,222) in the Washington, D.C. area at (703) 205-8000 in order to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Version with Markings to Show Changes Made

IN THE CLAIMS:

The claims have been amended as follows:

1. (Three Times Amended) A millimeter band signal transmitting/receiving system, comprising:

a transmitter transmitting a millimeter band signal wave;

a propagation path forming portion forming at least one indirect propagation path for propagation of said millimeter band signal wave; and

a receiver capable of simultaneously receiving a plurality of said millimeter band signal waves from a plurality of propagation paths including a line of sight propagation path to said transmitter and said at least one indirect propagation path, and receiving said millimeter band signal wave from at least one of said plurality of propagation paths.

11. (Twice Amended) A millimeter band signal transmitting/receiving system, comprising:

a plurality of transmitters; and

a receiver arranged to simultaneously receive a plurality of millimeter band signal waves output from said plurality of transmitters,

said plurality of millimeter band signal waves being transmitted from said plurality of transmitters having a same frequency.

15. (Twice Amended) A house provided with a millimeter band signal transmitting/receiving system including a structural component defining an internal space and a millimeter band signal transmitting/receiving system, wherein said millimeter band signal transmitting/receiving system comprises:

a transmitter transmitting a millimeter band signal wave;

a propagation path forming portion arranged in said structural component for forming at least one indirect propagation path for propagation of said millimeter band signal wave; and

a receiver simultaneously receiving a plurality of millimeter band signal waves through a plurality of propagation paths including a line of sight propagation path to said transmitter and said at least one indirect propagation path.

18. (Amended) A millimeter band signal transmitting/receiving system, comprising:

at least one transmitter transmitting a millimeter band signal through an associated transmit antenna along a plurality of propagation paths of said millimeter band signal formed by said associated transmit antenna including a line of sight propagation path between said associated transmit antenna and a receive antenna;

a receiver receiving the millimeter band signal through said receive antenna,

wherein, in a normal state when said line of sight propagation path is unobstructed, said receiver receives the millimeter band signal through each of the plurality of propagation paths including said line of sight propagation path, and

wherein, in an obstructed state when said line of sight propagation path is obstructed, said receiver receives the millimeter band signal through each of the plurality of propagation paths except said line of sight propagation path.